

» **Case Report** «

Successful Percutaneous Coil Embolization of a Ruptured Internal Iliac Artery Aneurysm Remnant after Abdominal Aortic Aneurysm Repair via the Deep Iliac Circumflex Artery

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Here, we describe a case of an 83-year-old man treated with percutaneous IIA coil embolization for an enlarging remnant IIA aneurysm. CT scans revealed a contained rupture and persistent flow in the right IIA with the enlargement. We selected percutaneous embolization via the deep iliac circumflex artery, that was communicating with the superior gluteal artery and the IIA. Coil embolization of the arteries supplying the IIA aneurysm was successfully performed with 12 embolization coils placed in the IIA and its branches. The absence of blood flow and shrinkage of the aneurysm were confirmed by CT three months after embolization.

Keywords: remnant IIA aneurysm rupture, iliac circumflex artery, coil embolization for IIA rupture

Background

Open surgical repair of internal iliac artery (IIA) aneurysms can be complicated by difficult exposure, particularly those that are large or inflammatory in nature. Small aneurysms may be treated by ligating the proximal segment of the IIA while the distal run-off branches are left intact, but this exclusion may cause aneurysms to expand and even rupture.^{1,2)}

Given its location deep in the pelvis, surgical ligation of all IIA branches for an internal iliac aneurysm is particularly invasive procedure. Ruptured IIA aneurysms are associated with a high mortality rate in the range of 33%–50%,³⁾ and transfusions are frequently required to counter blood loss.⁴⁾ Give less invasiveness, endovascular embolization of IIA aneurysms is a good alternative for elderly patients, who had many

complications. Catheter-based access to the IIA is possible via the superior or inferior gluteal arteries in an antegrade manner. This technique has been used to administer chemotherapy for the treatment of gynecologic or urologic cancers.⁵⁾ To the best of our knowledge, access to the IIA via the gluteal arteries in a retrograde manner has rarely been reported.

Here, we report a case of an elderly patient with a ruptured IIA aneurysm following proximal ligation of IIA and abdominal aortic aneurysm (AAA) repair performed 16 years ago, which was successfully treated with percutaneous coil embolization via the deep iliac circumflex artery accessed in a retrograde manner.

Case Report

An 83-year-old man with a history of open AAA repair, emphysema, chronic heart failure and angina pectoris presented with abdominal pain secondary to a ruptured right IIA aneurysm. At the age of 67, he underwent open surgical repair for impending rupture of a 5-cm AAA and a bilateral common iliac and IIA aneurysms that were 3 and 2 cm in diameter, respectively. In that procedure, the AAA was repaired

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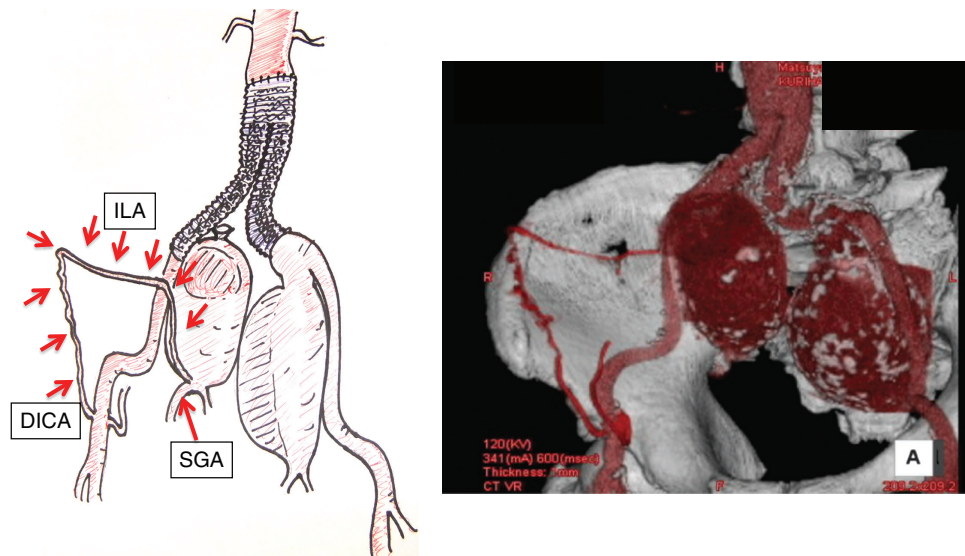


Fig. 1 The cause of blood flow to the right internal iliac artery (IIA). The superior gluteal artery (SGA) provided the inflow to the right IIA and communicated with the deep iliac circumflex artery (DICA) via the iliolumbar artery (ILA).

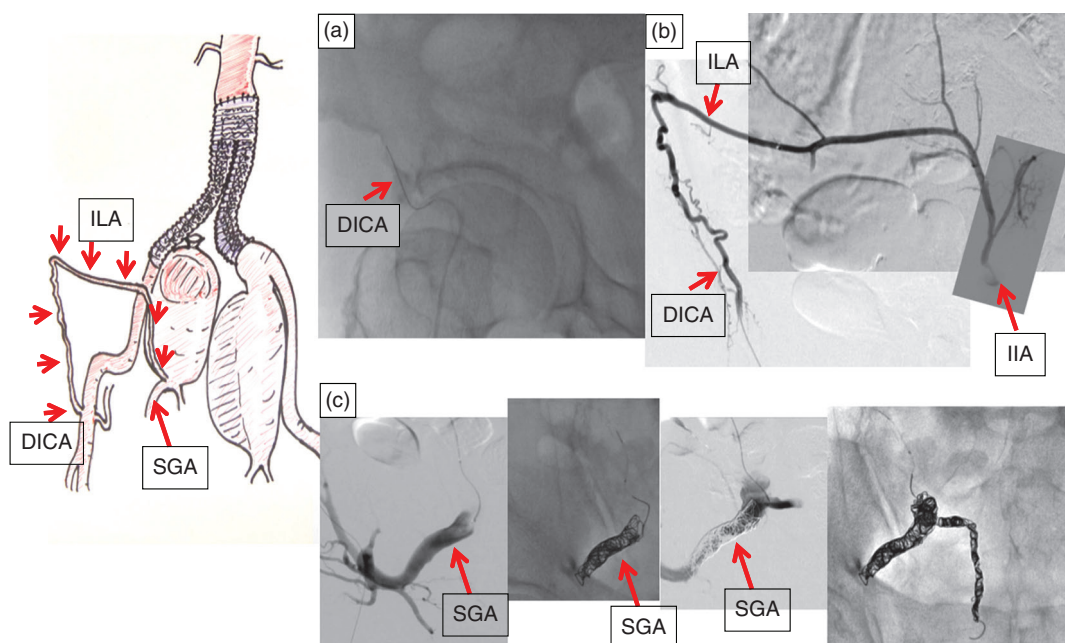


Fig. 2 Coil embolization of the right internal iliac artery (IIA) and superior gluteal artery (SGA) that were accessed via the deep iliac circumflex artery (DICA) and the iliolumbar artery (ILA). The 0.014-inch guidewire was passed into the right DICA using a microcatheter (A). An angiogram showing the right IIA aneurysm and its branches (B). Coil embolization of the arteries supplying the IIA aneurysm was successfully performed with 12 embolization coils placed in the IIA and its branches (C).

using a bifurcated Dacron graft and the common iliac aneurysms were resected. The right IIA was ligated at its origin from the common iliac artery and the right limb of the graft was anastomosed to the right external iliac artery. The left IIA was preserved in order to avoid postoperative ischemic colitis.

An abdominal computed tomographic (CT) scan showed bilateral IIA aneurysms with the excluded right IIA aneurysm at 6 cm with a contained rupture. A contrast CT scan revealed blood flow in the right IIA aneurysm. After carefully examining the cause of the blood flow to the right IIA, we concluded that

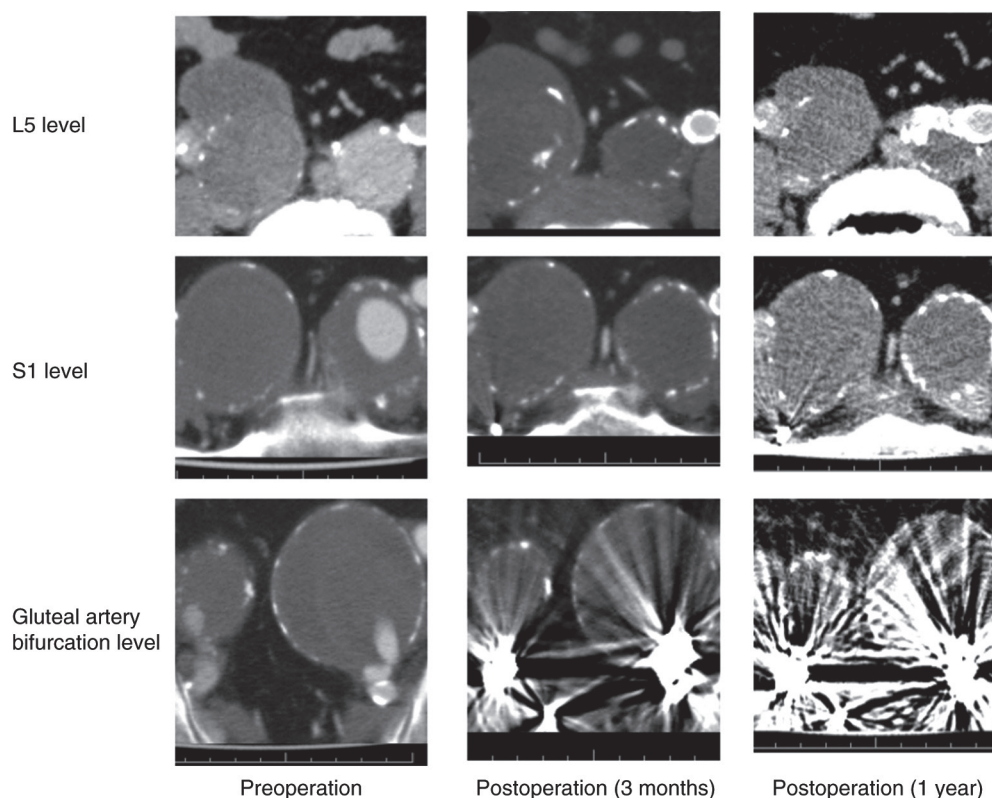


Fig. 3 Postoperative computed tomographic (CT) scans revealed complete thrombosis and shrinkage of the aneurysm at the three levels of height (L5 level, S1 level and gluteal artery bifurcation level). The left panels show images that were taken preoperatively, while the middle panels were taken three months postoperatively and the lower panels were taken one year postoperatively. One year after the procedure, the bilateral aneurysms had shrunk: the size of the right internal iliac artery (IIA) aneurysm was reduced from 4.9×6.0 cm to 4.1×5.7 cm (S1 level), and the left IIA aneurysm was reduced from 4.6×5.4 mm to 4.5×4.7 cm (S1 level).

the superior gluteal artery provided inflow to the right IIA and communicated with the deep iliac circumflex artery via the iliolumbar artery (Fig. 1). We decided to perform endovascular intervention instead of open surgery because of the patient's advanced age and the presence of cardiorespiratory comorbidities.

During the procedure, the patient was placed in the supine position and given local anesthesia. The 3 French introducer sheath was inserted percutaneously into the right common femoral artery using the Seldinger technique and a 0.014 inch guidewire was passed into the right deep iliac circumflex artery using a microcatheter (Fig. 2A). Using contrast angiography, the catheter was passed into the IIA via the iliolumbar and superior gluteal arteries. An angiogram showed the right IIA aneurysm and arterial branches (Fig. 2B). After angiography, four embolization coils (20–200 mm and three coils of 15–150 mm; Micrus Embolization Microcoil System, Micrus

Endovascular San Jose, California, USA) were inserted into the superior gluteal artery, three embolization coils (three coils of 15–150 mm; Micrus Embolization Microcoil System, USA) into the inferior gluteal artery, and one embolization coil (20–200 mm; Micrus Embolization Microcoil System, USA) into the aneurysm and the feeding arteries (Fig. 2C). A completion angiogram confirmed the absence of blood flow in the aneurysm.

One week after right IIA embolization, we excluded the left IIA by inserting a stent graft leg device (GORE® EXCLUDER® Contralateral Leg Endoprosthesis, PXC121200; W.L. Gore & Assoc, Inc., Sunnyvale, California, USA) that expanded from the left limb of the graft to left external iliac artery, in advance we performed unilateral femoral artery exposure and coil embolization of the unilateral IIA under local anesthesia. The postoperative course was uneventful. Follow-up CT scans at 3 months and one

year after the procedure revealed complete thrombosis and shrinkage of the aneurysm (Fig. 3).

Discussion

Cases of excluded IIA that enlarged or ruptured following proximal ligation have been documented.^{1,2)} Darling et al. reported that 4% of excluded AAAs had persistent blood flow in the aneurysm sac and 0.6% of these aneurysm went on to rupture.⁶⁾ In the present case, the persistent flow may be related to the superior gluteal artery, the inferior gluteal artery and the obturator artery serving as inflow and outflow conduit, respectively.

Though surgical exposure and manipulation of the distal branch of IIA is sometimes difficult, it has proven necessary in case of IIA aneurysm repair.^{1,2)} In the present case, a 6 cm aneurysm redeveloped in an IIA aneurysm that had been excluded from the circulation by proximal ligation 16 years prior to the current presentation. Surgical access is considered difficult in patient with previous laparotomies and those with large bilateral IIA aneurysms, and coil embolization is an appropriate intervention in the present case. Endovascular methods including direct puncture of the gluteal artery,^{7,8)} CT-guided direct puncture for aneurysm,⁹⁾ or translumbar direct puncture approach¹⁰⁾ have been reported and may be performed in cases where percutaneous exclusion is difficult. The percutaneous method was possible in the present case as we were familiar with endovascular coil embolization of type II endoleak due to a lumbar artery after endovascular aneurysmal repair.¹¹⁾

Disclosure Statement

Takahiro Ohmine and the authors have no conflict of interest.

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